Name: Date:

Exam: Function Reflections (Solution version 622)

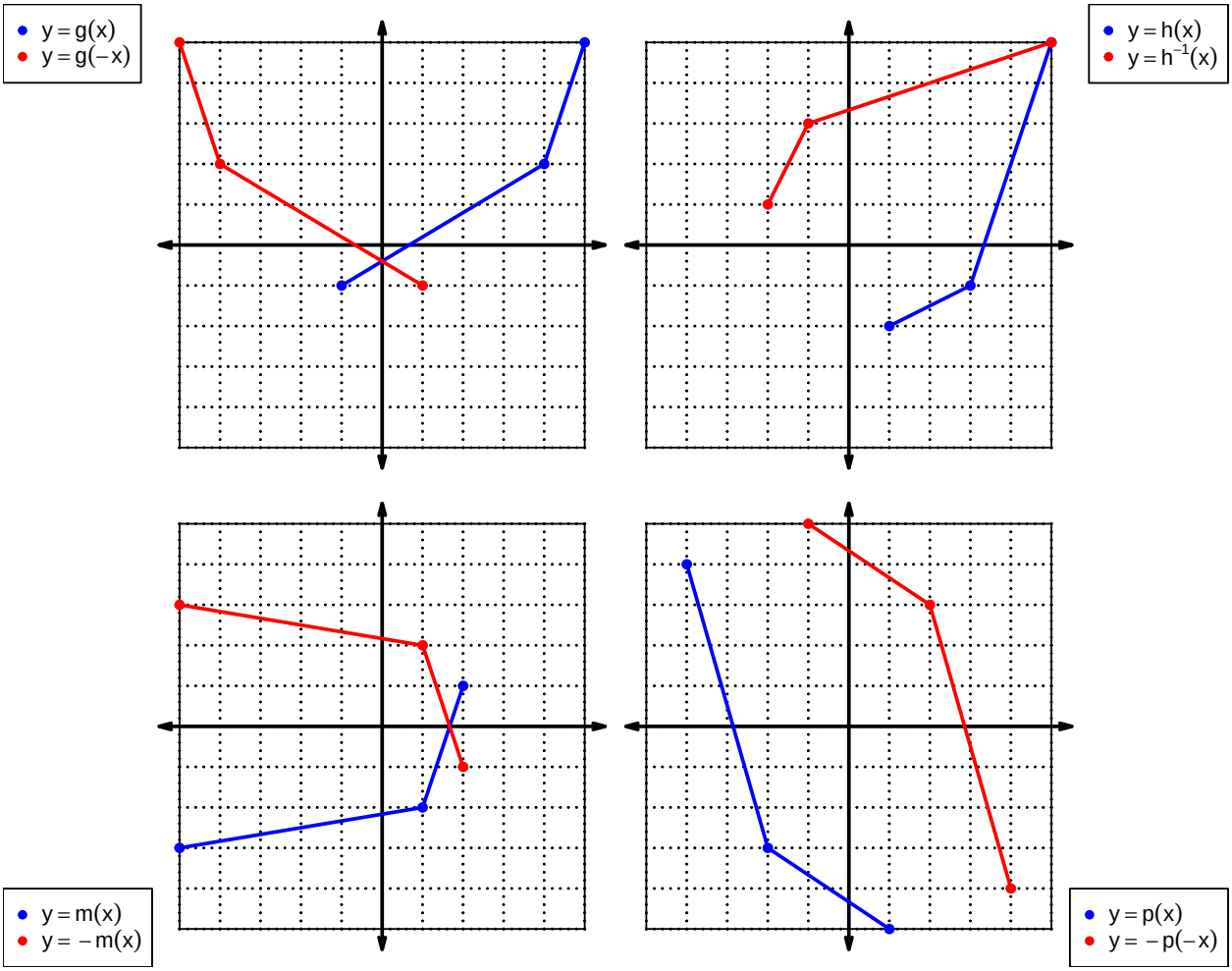
1. (worth 9 points) Let function f be defined by the polynomial below:

$$f(x) = -9x^5 - 4x^4 + 5x^3 - 7x^2 - 6x - 8$$

Draw lines that match each function reflection with its polynomial:

Reflections	Polynomials
$f(-x)$	$9x^5 - 4x^4 - 5x^3 - 7x^2 + 6x - 8$
$-f(x)$	$9x^5 + 4x^4 - 5x^3 + 7x^2 + 6x + 8$
$-f(-x)$	$-9x^5 + 4x^4 + 5x^3 + 7x^2 - 6x + 8$

2. (worth 20 points) In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	7	3	6
2	9	7	1
3	2	5	4
4	8	1	5
5	1	8	2
6	5	6	8
7	6	9	7
8	4	2	9
9	3	4	3

3. (worth 3 points) Evaluate $f(2)$.

$$f(2) = 9$$

4. (worth 3 points) Evaluate $g^{-1}(3)$.

$$g^{-1}(3) = 1$$

5. (worth 3 points) Assuming g is an **odd** function, evaluate $g(-7)$.

If function g is odd, then

$$g(-7) = -9$$

6. (worth 3 points) Assuming h is an **even** function, evaluate $h(-6)$.

If function h is even, then

$$h(-6) = 8$$

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7. (worth 15 points) A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
Let polynomial p be defined with the following equation:

$$p(x) \;=\; -x^3 + 1$$

a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) \;=\; -(-x)^3 + 1$$
$$p(-x) \;=\; x^3 + 1$$

b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) \;=\; -\left(x^3 + 1\right)$$
$$-p(-x) \;=\; -x^3 - 1$$

c. Is polynomial p even, odd, or neither?

neither

d. Explain how you know the answer to part c.

We see that $p(x)$ is not equivalent to either $p(-x)$ or $-p(-x)$, so p is neither even nor odd.

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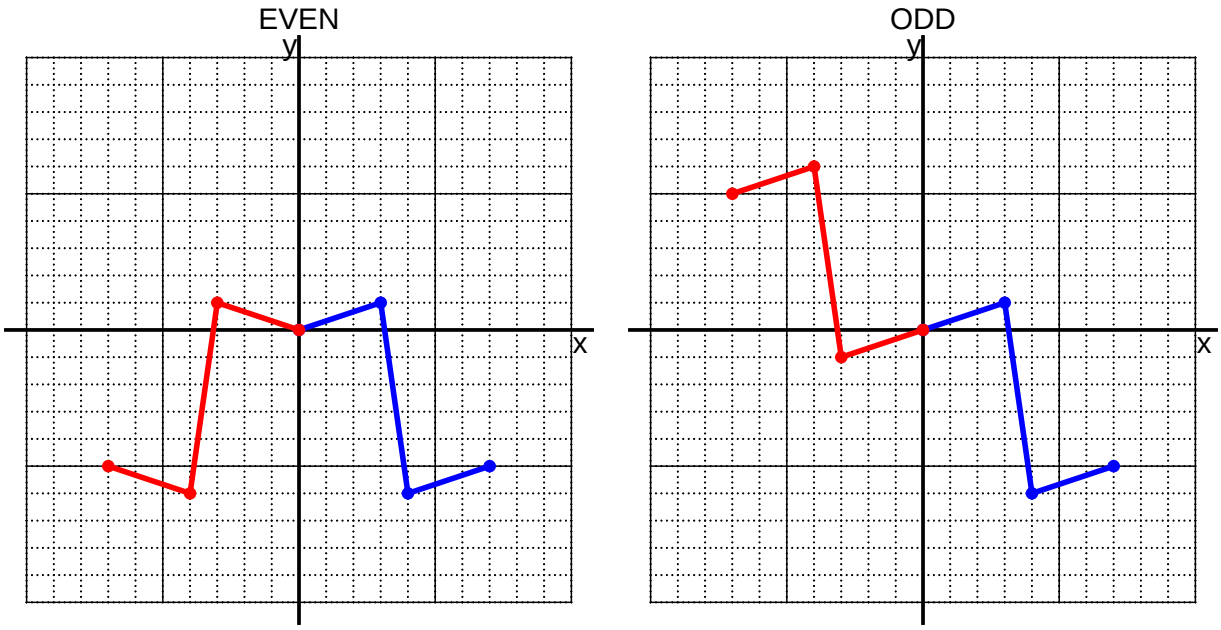
8. (worth 10 points) I have drawn half of a function. Draw the other half to make it even or odd.



9. (worth 10 points) Let function f be defined with the equation below.

$$f(x) = 8x - 4$$

a. Evaluate $f(5)$.

step 1: multiply by 8
step 2: subtract 4

$$f(5) = 8(5) - 4$$
$$f(5) = 36$$

b. Evaluate $f^{-1}(52)$.

step 1: add 4
step 2: divide by 8

$$f^{-1}(x) = \frac{x+4}{8}$$
$$f^{-1}(52) = \frac{(52)+4}{8}$$
$$f^{-1}(52) = 7$$

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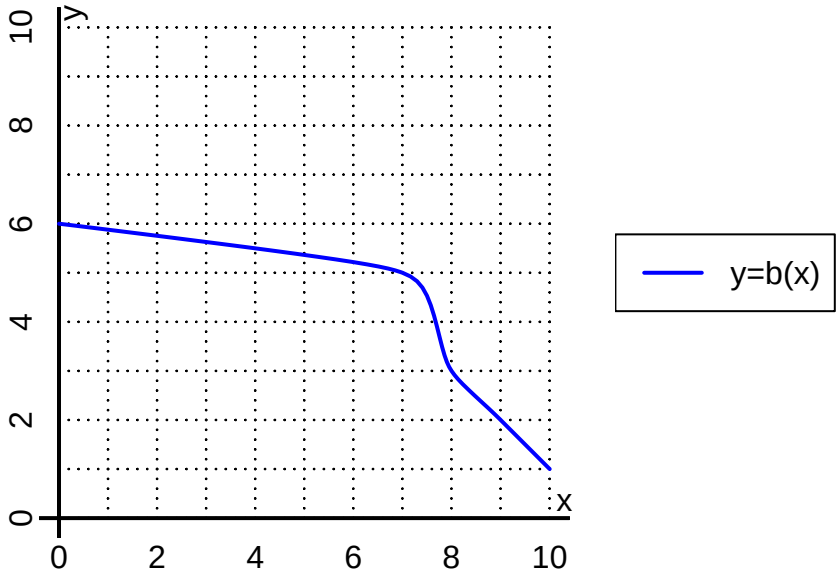
10. (worth 6 points) The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(8)$.

$b(8) = 3$

b. Evaluate $b^{-1}(5)$.

$b^{-1}(5) = 7$

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11. (worth 18 points) Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	5	-5	-5	5
-1	-6	6	6	-6
0	0	0	0	0
1	6	-6	-6	6
2	-5	5	5	-5

b. Is function f even, odd, or neither?

odd

c. How do you know the answer to part b?

Function f is odd because column $-f(-x)$ matches column $f(x)$ exactly.